Executive Summary

The U.S. Army asked the National Research Council (NRC) to form a committee to advise the Product Manager for Non-Stockpile Chemical Materiel (PMNSCM) on proposed plans for implementing newly recommended limits on airborne concentrations of chemical agents.[1] The limits, called airborne exposure limits (AELs), are designed to protect demilitarization workers, the general public, and emergency responders from the toxic effects of airborne exposure to chemical agents. The Centers for Disease Control and Prevention (CDC) issued AELs in 1988 and revised them in October 2003 (for the nerve agents tabun (GA), sarin (GB), and VX) and May 2004 (for the blister agent mustard (H and HD)). The new limits were to be implemented on January 1, 2005, and July 1, 2005, respectively.[2]

The Army's non-stockpile program is responsible for dismantling former chemical agent production facilities and destroying recovered chemical materiel.[3] Assistance from the NRC was requested on means for implementing the 2003/2004 AELs in connection with two specific tasks: (1) the destruction of a former VX production facility at the Newport Chemical Depot (NECD) in Indiana and (2) the operation of two mobile systems, the explosive destruction system (EDS) and the rapid response system (RRS). The EDS and RRS constitute the non-stockpile program's primary mobile systems for destroying recovered chemical weapons and materiel that were previously buried at military installations and other sites.

The CDC recommended new values for four types of AELs:

- The short-term exposure limit (STEL), for worker exposures of no more than 15 minutes.
- The worker population limit (WPL), for unprotected workers.
- The general population limit (GPL), for the unprotected general population.
- The immediately dangerous to life or health (IDLH) level.

In addition to specifying the length of time workers may operate safely at low levels of exposure, the AELs affect decisions about the personal protective equipment (PPE) workers should wear to avoid exposure and the monitoring equipment necessary to track ambient air concentrations. Table ES-1 further describes these four types of AELs.

COMMITTEE APPROACH

In accordance with the statement of task (see Preface), the committee reviewed facility designs and operational procedures for (1) dismantlement of the former production facility at NECD and (2) the use of the mobile EDS and RRS platforms. Committee members visited NECD to meet with Army and contractor staff tasked with destroying the former VX production facility; other committee members traveled to Dugway Proving Ground (DPG), Utah, to observe monitoring operations during use of the EDS to destroy 4.2-inch mortar rounds. To understand CDC's basis for establishing

[1] In addition to former chemical agent production facilities and recovered materiel, the non-stockpile program includes buried materiel (munitions or other), components of binary chemical weapons, and miscellaneous materiel. Non-stockpile chemical materiel (NSCM) is materiel not in the current U.S. inventory of chemical munitions. Much of the NSCM was buried at current and former military installations in 31 states, the U.S. Virgin Islands, and the District of Columbia (U.S. Army, 1996).

[2] One feature of the chemical warfare materiel destruction program is that the Secretary of the Department of Health and Human Services is required to recommend measures as needed to protect the public health (Federal Register, 2004). In practice, these precautionary measures are determined by the CDC. Accordingly, in response to a request by the Army Surgeon General in June 2000 to review levels proposed by the U.S. Army Centers for Health Promotion and Preventive Medicine (CHPPM) and following publication in the Federal Register of proposed limits and a period of public comment, the CDC issued the new AELs (Federal Register, 2003a, 2004).

[3] Much of the recovered chemical materiel was buried on current and former military sites and is being recovered as the land is remediated.